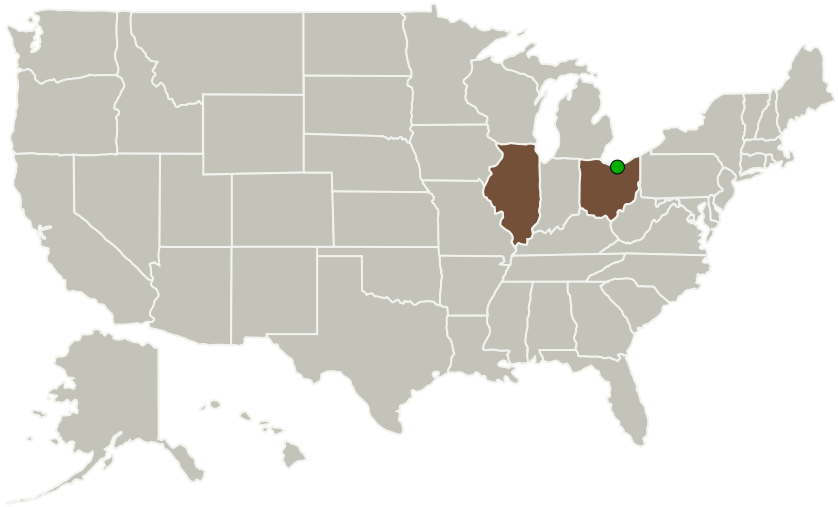
Lightweight, Flexible Photovoltaic Module, Phase I

Completed Technology Project (2012 - 2012)

Project Introduction

With recent advances in MicroLink's inverted metamorphic (IMM) multijunction epitaxial lift off (ELO) solar cells, new opportunities for solar cell packaging are possible that leverage the inherent physical flexibility of these high efficiency solar cells. Novel photovoltaic (PV) blankets can be constructed with these flexible and modular solar cells. Arrays of these ELO solar cells are first interconnected and then laminated to a flexible Tedlar backsheet. Thin coverglass protecting the cell from space environments is then applied onto the top of each cell and secured with space-grade encapsulants. High volume pick and place tooling from the semiconductor wafer industry can be applied to this assembly process to realize substantial cost reduction in the assembly of these solar cell modules. The resulting modular high efficiency photovoltaic blankets can readily be used as a drop-in replacement for current solar cells mounted on solar panels. Since the photovoltaic blanket is composed of several solar cells pre-assembled into an array format, the assembly process is streamlined where arrays of multiple cells are now placed down during panel assembly. Since MicroLink's IMM ELO solar cells are flexible, the resulting solar array module is also flexible and can be readily applied and conformed to flat and curved surfaces on a spacecraft. With this flexible module approach, large solar array concepts having high specific powers and improved stowage capabilities can be achieved. ATK's UltraFlex Solar Array System is a potential platform where these flexible modules could be applied.

Primary U.S. Work Locations and Key Partners



Lightweight, Flexible Photovoltaic Module, Phase I

Table of Contents

Lightweight, Flexible Photovoltaic Module, Phase I

Completed Technology Project (2012 - 2012)

Organizations Performing Work	Role	Type	Location
MicroLink Devices, Inc.	Lead Organization	Industry Minority-Owned Business	Niles, Illinois
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Illinois	Ohio

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138253)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

MicroLink Devices, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

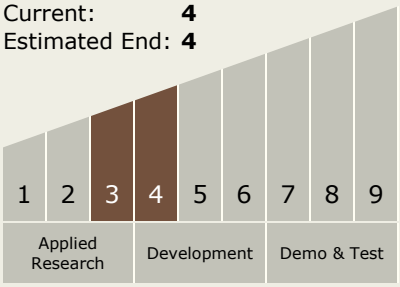
Carlos Torrez

Principal Investigator:

Ray Chan

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Lightweight, Flexible Photovoltaic Module, Phase I

Completed Technology Project (2012 - 2012)

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.1 Photovoltaic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System